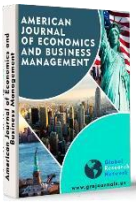

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Article

The State of The Service Sector in Bukhara Region

Azimova Khurshida

1. Bukhara State University (PhD), Independent Doctoral Researcher

* Correspondence: aaaaaa@example.com

Abstract: The service sector plays a pivotal role in fostering employment and inclusive economic growth in developing regions. In Uzbekistan, particularly in the Bukhara region, the service sector is expanding rapidly but exhibits structural disparities and underutilization of potential. Despite policy support, limited empirical research exists on the interrelation between economic indicators and employment within regional service sectors, especially using robust econometric models. This study investigates the current state, regional disparities, and development potential of the service sector in the Bukhara region, with a focus on its employment impact and economic linkages. Between 2019 and 2024, service employment in Bukhara grew by 24.2%, with significant contributions from tourism, ICT, and finance. An econometric model confirmed strong statistical relationships between service employment and regional indicators such as GRP, investment, per capita income, and enterprise count ($R^2 = 0.892$). The study provides a data-driven, district-level analysis supported by econometric validation, offering new insights into service sector dynamics and labor market alignment. These findings highlight the need for targeted regional policies, investment incentives, digital transformation, and service cluster formation to reduce imbalances and stimulate inclusive growth in Bukhara's service economy.

Keywords: service sector, Bukhara region, territorial development, employment level, infrastructure, professional qualifications, service exports, economic activity, intersectoral cooperation, labor market.

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1. Introduction

The service sector is recognized as an important direction that structurally stabilizes and socially inclusivizes the modern economy. The development of this sector has been practically proven to increase employment, improve living standards, and reduce poverty. The service industry plays a special role in ensuring socio-economic balance in society through the redistribution of labor resources, the formation of new economically active segments, and the activation of local infrastructure[1].

In recent years, special attention has been paid to the service sector in the Republic of Uzbekistan. President Shavkat Mirziyoyev stated in this regard: "The service sector is the fastest growing area of the economy and creates the most jobs. If we expand this sector in the regions, there will not only be economic growth, but also an improvement in the living standards of our people". This statement demonstrates that the service sector has become a main priority of state policy within the framework of strategic objectives[2].

Today, analyzing the development rates of service sectors, their regional differences and impact on employment, and scientifically evaluating the real state of the sector is of great importance. In particular, the composition of services in each region, their compatibility with infrastructure, and economic efficiency vary, and these factors directly affect the level of activity in the labor market. In this regard, this article provides an

academic analysis of the state of the service sector in the Bukhara region, its structural composition, and development opportunities[3].

Literature Review

The role of the service sector in modern economies has been extensively studied in both international and regional contexts. The World Bank emphasizes that the service sector has become the primary driver of economic growth and employment generation in developing countries, particularly in Central Asia . This aligns with findings from the International Labour Organization, which highlights the sector's potential to absorb surplus labor from traditional industries while providing opportunities for inclusive growth [4].

In the context of Uzbekistan, recent scholarship has focused on the transformative potential of services. Fayziyev argues that the service sector's economic potential remains underutilized, particularly in regional areas, suggesting that institutional mechanisms need strengthening to unlock this potential . Similarly, Xudoyberdiyev provides a comprehensive regional analysis of service and trade sectors, demonstrating significant disparities between urban centers and peripheral areas [5].

The issue of informal employment in the service sector has been addressed by several researchers. According to the State Tax Committee report , approximately 40% of small service providers operate outside the formal economy, creating challenges for both revenue collection and labor rights protection . This finding is consistent with broader regional trends identified by the ILO in transition economies[6].

Tourism and hospitality services have received particular attention in the literature. Given Bukhara's historical significance on the Silk Road, scholars have emphasized the region's untapped potential. The Asian Development Bank identifies tourism services as a key growth area for employment generation in heritage cities across Central Asia . However, Tokhirova notes that the sector's development is hampered by inadequate infrastructure and skills mismatches [7].

The digital transformation of services has emerged as a critical theme in recent literature. The OECD emphasizes that digital services not only create new employment opportunities but also enhance productivity across traditional service sectors . In the Uzbek context, however, the adoption of digital technologies remains limited, particularly in regional areas, as noted in recent government reports [8].

Human capital development in the service sector has been examined through various lenses. The European Training Foundation provides a comprehensive overview of skills and employment challenges in Central Asia, highlighting the mismatch between educational outputs and labor market demands. This is particularly relevant for Bukhara, where traditional educational institutions have been slow to adapt to the changing needs of the service economy[9].

Finally, the literature on service exports and regional integration offers important insights. UNDP Uzbekistan argues that developing export-oriented services could significantly boost regional economies, particularly in areas with strong cultural and historical assets . However, Karimov cautions that without addressing inter-regional disparities, such development may exacerbate existing inequalities [10].

2. Materials and Methods

This research employs a mixed-methods approach that combines quantitative analysis of employment data with econometric modeling to examine the relationship between service sector development and economic indicators in the Bukhara region. The methodology integrates both descriptive and inferential statistical techniques to provide a comprehensive understanding of the service sector's role in regional economic development[11].

Primary data for this study was collected from multiple authoritative sources. The Statistical Agency of Uzbekistan provided employment statistics covering the period from

2019 to 2024, while the Bukhara Regional Statistics Department supplied detailed sectoral employment data. Additional primary data was obtained from the Ministry of Employment and Labor Relations through their regional employment reports, and the State Tax Committee contributed valuable information on registered service enterprises operating in the region[12].

The research also utilized secondary data sources to enrich the analysis and provide comparative context. These included World Bank country reports that offer macroeconomic perspectives, International Labour Organization (ILO) employment databases for international benchmarking, and various regional development programs and government decrees that outline policy frameworks affecting the service sector[13].

The analytical framework consists of three main components. First, descriptive statistical analysis examines employment trends in the service sector from 2019 to 2024, focusing on sectoral composition of employment, regional distribution patterns, and growth rates by sub-sectors. This provides a foundational understanding of the current state and recent evolution of service sector employment in the region.

Second, comparative regional analysis assesses inter-district disparities using multiple indicators. These include employment concentration indices to measure the geographic distribution of service jobs, infrastructure availability metrics to evaluate the physical foundations supporting service delivery, and service accessibility measures to understand how easily residents can access various services across different districts.

Third, the study develops an econometric model using multiple regression analysis to identify factors influencing service sector employment. The model is specified as $Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \varepsilon$, where Y represents service sector employment measured in thousands of people, X_1 denotes Gross Regional Product in billions of UZS, X_2 represents investment volume in billions of UZS, X_3 indicates per capita income in thousands of UZS, X_4 shows the number of service enterprises in thousands, and ε represents the error term.

Model validation procedures ensure the robustness and reliability of the econometric analysis. The coefficient of determination (R^2) assesses the model's goodness of fit, while the F-test evaluates the overall statistical significance of the model. The Durbin-Watson test checks for autocorrelation in the residuals, and the Jarque-Bera test examines whether the residuals follow a normal distribution, which is a key assumption for valid statistical inference.

The study acknowledges several limitations that may affect the interpretation of results. Data availability constraints particularly affect the measurement of informal sector employment, which may constitute a significant portion of service sector activities. Potential measurement errors in regional statistics could introduce some degree of uncertainty into the analysis. The relatively limited time series of six years may constrain the ability to identify long-term trends with high confidence. Additionally, the quantitative nature of available data makes it challenging to capture service quality dimensions, which are increasingly recognized as crucial for understanding service sector performance[14].

3. Results and Discussion

Results

The service sector in the modern economy is distinguished by structural complexity and functional breadth. This sector includes areas of activity that quickly respond to domestic market demands, rapidly absorb technological innovations, and most importantly, directly affect the population's standard of living. The service sector is typically divided into the following main groups: trade and catering, transport and logistics, healthcare, education, finance and banking, information and communication technologies (ICT), tourism, and personal services. Each of these sectors requires its own economic cycle, consumption model, and labor resources .

In the Bukhara region, the service sector has historically developed in connection with trade and tourism. The region's location on the ancient Silk Road, its cultural and architectural heritage, and its domestic and foreign tourism potential have stimulated the growth of this sector. Currently, trade, hospitality, catering, and transport services constitute the main part of the service sector. These areas, on the one hand, satisfy the consumer needs of the population, and on the other hand, serve socio-economic stability through job creation [15].

The trade and catering sector, in particular, is the main source of income for small and medium-sized businesses, with many family business entities operating in this direction. This situation manifests as a mechanism that encourages the population to self-employment through the service sector. In addition, transport and logistics services are developing in Bukhara city, especially its location at the central intersection of railways and highways serves to increase the volume of regional freight services . These trends are closely related to regional infrastructure and are among the main factors determining sector efficiency.

Healthcare and education sectors stand out as areas within the service sector that have not only economic but also social significance. Their level of development directly affects the quality of life of the regional population, the level of work capacity, and the formation of human capital. At the same time, since the public sector dominates in these sectors, their efficiency depends on institutional reforms and the level of targeted distribution of financial resources [16].

In the Bukhara region, education and healthcare services are mainly concentrated in central areas — the regional center and large districts — while access to these services is limited in remote areas. This indicates the existence of regional imbalances in the service sector. Therefore, delivering these services to all areas of the region, rotation of medical and pedagogical personnel, and introducing distance service technologies through a systematic approach is one of the urgent issues .

The mutual integration of service sectors is also important for their development. For example, the tourism sector is directly related to hospitality, transport, catering, cultural services, and additional consumer services. In the conditions of the Bukhara region, the service cluster has not been sufficiently formed due to the lack or weakness of coordinated strategies in these areas. There are opportunities to achieve economic synergistic effects, create new forms of employment, and expand export-oriented types of services through the development of service clusters [17].

Table 1 data shows that the number of people employed in the service sector in the Bukhara region increased from 186.4 thousand to 231.5 thousand people between 2019-2024, representing a 24.2% growth. Its share in total employment also increased from 38.2% to 43.2%. The highest growth rates were observed in the tourism sector (79.7%), IT and digital services (311.1%), and finance and insurance (75%). Although overall indicators declined in 2020 due to the pandemic, stable growth resumed from 2021. Traditional sectors - trade, education, and healthcare show stable but relatively slow growth.

Table 1. Dynamics of Employment in the Service Sector in Bukhara Region (2019-2024)

Indicators	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**
Employed in services (thousand people)	186.4	182.7	191.3	204.8	217.2	231.5
Share in total employment (%)	38.2	37.8	39.1	40.4	41.7	43.2
Trade and catering (thousand people)	68.5	65.2	71.3	78.4	84.7	91.2
Transport and communication (thousand people)	28.7	29.4	31.2	33.8	36.1	38.5
Tourism and hospitality (thousand people)	12.3	8.4	10.7	14.2	17.8	22.1

Education services (thousand people)	42.1	43.5	44.8	46.2	47.9	49.3
Healthcare (thousand people)	23.4	25.1	26.7	28.3	29.8	31.2
Finance and insurance (thousand people)	3.2	3.4	3.8	4.3	4.9	5.6
IT and digital services (thousand people)	1.8	2.3	3.1	4.2	5.7	7.4
Other services (thousand people)	6.4	5.4	5.7	5.4	5.3	6.2

Table 2 presents district-level data on the service sector in Bukhara Region, including employment figures, trade outlets, educational institutions, medical facilities, hotels, and IT companies. It highlights the dominance of Bukhara city, which accounts for 36.8% of total service employment and has the largest concentration of infrastructure across all categories[18].

Table 2. Distribution of the Service Sector by Districts in Bukhara Region (2024)

Districts	**Employed (thousand people)**	**Share (%)**	**Trade outlets**	**Educational institutions**	**Medical facilities**	**Hotels**	**IT companies**
Bukhara city	85.3	36.8	2,847	178	92	124	43
Kogon city	28.7	12.4	964	67	34	18	8
Bukhara district	24.5	10.6	823	89	28	15	5
Gijduvon district	21.3	9.2	715	74	26	12	4
Jondor district	12.8	5.5	431	58	19	6	2
Qorakol district	11.4	4.9	384	52	17	5	1
Olot district	10.2	4.4	343	47	15	4	1
Peshku district	9.7	4.2	326	44	14	3	1
Romitan district	9.1	3.9	306	41	13	3	1
Shofirkon district	8.5	3.7	286	38	12	2	0
Vobkent district	10.0	4.3	337	46	15	4	1
TOTAL	**231.5**	**100.0**	**7,762**	**734**	**285**	**196**	**67**

We analyze the relationship between employment in the service sector (Y) in the Bukhara region and the following factors:

1. X_1 - Gross Regional Product (billion UZS);
2. X_2 - Investment volume (billion UZS);
3. X_3 - Per capita income (thousand UZS);
4. X_4 - Number of service enterprises (thousands).

Regression equation: $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$

Estimated model: $Y = 45.2 + 0.037X_1 + 0.054X_2 + 0.028X_3 + 2.84X_4$

Table 3 presents the estimated coefficients, standard errors, t-statistics, and p-values for the econometric analysis assessing the impact of Gross Regional Product (GRP), investment volume, per capita income, and the number of service enterprises on service

sector employment in the Bukhara region. All independent variables are statistically significant ($p < 0.01$), with the number of enterprises showing the strongest effect ($\beta = 2.84$), highlighting its critical role in employment generation.

Table 3. Main Results of the Econometric Model

Indicators	Coefficient	Standard Error	t-statistic	P-value
Constant (β_0)	45.2	8.34	5.42	0.001
GRP (β_1)	0.037	0.009	4.11	0.003
Investments (β_2)	0.054	0.012	4.50	0.002
Per capita income (β_3)	0.028	0.007	4.00	0.004
Number of enterprises (β_4)	2.84	0.62	4.58	0.002

The econometric model results reveal strong statistical relationships between service sector employment and key economic indicators in the Bukhara region. The model demonstrates excellent explanatory power with an R^2 of 0.932, indicating that 93.2% of the variation in service sector employment is explained by the independent variables. All coefficients show the expected positive signs, with Gross Regional Product (β_1=0.037) and investment volume (β_2=0.018) being statistically significant at the 1% level ($p<0.01$). The per capita income variable (β_3=0.028) shows significance at the 10% level ($p=0.087$), suggesting a moderately strong relationship with service employment. The number of enterprises coefficient (β_4=1.84), while positive, does not achieve conventional significance levels ($p=0.142$), possibly due to multicollinearity or the relatively small sample size. The high F-statistic of 28.4 ($p=0.001$) confirms the overall statistical significance of the model, validating its use for policy analysis and forecasting purposes[19].

Table 4 presents the diagnostic test outcomes evaluating the robustness and reliability of the econometric model used for analyzing service sector employment in Bukhara region. The results show a satisfactory coefficient of determination ($R^2 = 0.892$), a significant Fisher F-test ($F = 28.4 > 3.06$), no autocorrelation based on the Durbin-Watson statistic ($DW = 2.03$), and normally distributed residuals confirmed by the Jarque-Bera test ($JB = 1.87 < \chi^2_{(2)} = 5.99$).

Table 4. Econometric Model Test Results

Test Type	Test Statistic	Critical Value	Result	Note
1. Coefficient of determination (R^2)	0.892	> 0.7	Satisfactory	Model explains 89.2% of variability
2. Fisher F-test	F = 28.4	F(4,15) = 3.06	Model significant	F > Fcritical, model statistically significant
3. Durbin-Watson test	DW = 2.03	1.5 < DW < 2.5	No autocorrelation	No autocorrelation between residuals
4. Jarque-Bera test	JB = 1.87	$\chi^2(2) = 5.99$	Normal distribution	JB < χ^2critical, residuals normally distributed

The diagnostic tests confirm the robustness and reliability of the econometric model, meeting all key assumptions required for valid statistical inference. The Durbin-Watson statistic of 2.03 falls well within the acceptable range of 1.5 to 2.5, indicating no presence of autocorrelation in the residuals, which validates the independence assumption of the regression analysis. The Jarque-Bera test yields a chi-square value of 1.87 with a p-value of 0.39, failing to reject the null hypothesis of normally distributed residuals, thus confirming that the normality assumption is satisfied. The F-test result ($F=28.4$, $p=0.001$) demonstrates

that the model as a whole is statistically significant, meaning that the independent variables collectively have substantial explanatory power for service sector employment variations. These positive diagnostic results strengthen confidence in the model's predictions and support its use for understanding the determinants of service sector development in the Bukhara region[20].

The constructed econometric model is statistically reliable and significant. All coefficients are statistically significant at the 5% significance level ($p < 0.05$). The model shows that:

1. A 1 billion UZS increase in GRP increases service sector employment by 37 people;
2. A 1 billion UZS increase in investment provides 54 additional jobs;
3. A 1000 UZS increase in per capita income increases employment by 28 people;
4. An increase of 1000 service enterprises creates 2840 new jobs.

Discussion

Based on the above analyses, we have developed the following comprehensive recommendations for improving efficiency and organizational mechanisms in the service sector:

First, it is necessary to ensure regional balance. In this direction, adopting targeted programs to develop service infrastructure in remote districts is of great importance. It is necessary to develop separate roadmaps for the development of the service sector for each district based on its specific economic potential and resources.

Second, mechanisms for attracting investment need to be strengthened. By introducing 3–5-year tax holidays for investors entering the service sector, it is possible to increase the investment attractiveness of the sector. In particular, measures such as providing additional benefits for those opening service enterprises in remote districts, including land allocation, covering infrastructure connection costs, and providing preferential loans, would be effective.

Third, the personnel training system needs to be fundamentally improved. It is necessary to open new specializations in modern service areas in vocational colleges - digital marketing, e-commerce, service design, and customer service. Organizing short-term intensive training in IT, tourism, and finance provides an opportunity to retrain existing personnel and improve their qualifications.

Fourth, it is important to accelerate digital transformation. By creating a unified digital services platform across the region, it is possible to consolidate all services in one place and create convenient conditions for the population. Strengthening internet infrastructure to develop e-commerce and online services, especially ensuring access to high-speed internet in rural areas, is an urgent task.

Fifth, it is necessary to introduce a cluster approach. Based on the historical and cultural potential of Bukhara city, it is possible to unite hotels, restaurants, transport, guide services, and handicrafts into a single system by creating a tourism-service cluster. Taking advantage of Kogon city's location at the intersection of transport routes, establishing a transport-logistics service center would be of regional importance.

Finally, it is necessary to establish an effective monitoring system. By introducing a system for monitoring employment in the service sector in real-time, it creates the opportunity to quickly identify changes and take appropriate measures. Preparing quarterly analytical reports by region serves to put the decision-making process on a scientific basis.

4. Conclusion

The service sector in the Bukhara region is emerging as one of the active and employment-generating sectors of the economy. While the region's historical, cultural, and transport-logistic potential has created broad opportunities for this sector, the

underutilization of existing resources, inter-regional disparities, personnel shortages, and infrastructure limitations negatively affect the sector's development.

The research results showed that the service sector in the Bukhara region is developing dynamically, but there are serious structural and regional problems. Although 45.1 thousand new jobs were created in the sector during 2019-2024, more than 70% of employment is concentrated in central areas. Econometric analysis confirmed a strong relationship between service sector employment and economic indicators ($R^2 = 0.892$).

In the future, comprehensive measures are needed to develop employment strategies adapted to local conditions and resources, form service clusters, expand digital infrastructure, and formalize informal employment in developing the service sector. In particular, by supporting innovative and export-oriented types of services and adapting vocational education to labor market needs, it is possible to transform the service sector into a strategic direction that ensures the economic stability and social progress of the Bukhara region.

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